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Abstract

PROBLEMS OF DEVELOPMENT AND CONSTRUCTION OF THE FIRST CZECHOSLOVAK NUCLEAR POWER STATION

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A nuclear power station with 150 MWe gross power is being built in Czechoslovakia, furnished with gas cooled heavy water moderated reactor fuelled with natural uranium metal. Description of this power station was given at the second Geneva conference (A/Conf. 15/P/2092). The station is the joint achievement of the Czechoslovak-Soviet cooperation in the field of the peaceful uses of nuclear energy. The adopted conception of construction of the full scale power station without relevant experimental reactor requires verification of all important parts of the station by scientific-technical works in both nuclear and classical parts. The centre of these works is in the development, manufacture and functional verification of the station main part models in the scale 1:1. Financial and especially time pressure in respect of these works of course lead to some delay in the construction of the power station. The presented paper deals with works carried out in Czechoslovakia.

The main attention was devoted to the reactor pressure vessel development. The material was carefully chosen and the technology, especially welding, was tested. Problems of experimental strength were solved on many model installations from which the shortened model 1:1 is nearing the completion.

With respect to the high power rating and short time of the fuel exposition incidental to it the on-load fuel exchange has become a necessity. Great attention was therefore devoted to the development and design of the charge-discharge machine. Both separate parts and the whole prototype of this machine are functionally tested.

Mechanisms of all control and scram rods were subjected to versatile tests on a special stand that permitted experiments with model mechanism in the scale 1:1 at the working temperature and pressure of the cooling CO_2. Moreover the reliability and quality of the control system was tested on a prototype control loop with electronic model of the reactor kinetics.

Technology and operational ability of the steam generators were tested on fuel-scale model of one section, great attention being devoted to the tightness. The effects of temperature shocks in piping due to little thermal capacity of the reactor at scramming were investigated.

The applicability of unified parts of a classical power station turbine for working conditions in a nuclear power station were discussed especially with respect to greater moisture content of the steam.

Information and documentary shots of the site show the advanced state of the power station construction.

Development possibilities of this reactor type are under discussion.